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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/776,615

02/12/2004

Tadataka Edamura

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08/11/2006

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EXAMINER

LANE, JEFFREY D

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/776,615	<b>Applicant(s)</b> EDAMURA ET AL.	
	<b>Examiner</b> Jeffrey D. Lane	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7 and 8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1-6 and 9 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3/23/06.

### *Specification*

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 7 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al. (US 2004/0161006).

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As for claim 7 Chang discloses in figure 8, a quantum cascade laser comprising (See paragraph [0027]): a semiconductor substrate formed of GaAs 800; and an active layer 830, disposed on said semiconductor substrate 800 and having a plurality of quantum well (See figure 7) light emitting layers 220, generating light by means of intersubband transitions 230 in a quantum well structure (See figure 7), and a plurality of injection layers 210, respectively disposed between the plurality of quantum well light emitting layers and forming a cascade structure along with said quantum well light emitting layers; and wherein said quantum well light emitting layers and said injection layers of said active layer are formed to contain group III-V compound semiconductors, each containing, as the group V elements, N and at least one element selected from the group consisting of As, P, and Sb (See Paragraph [0046]).

As for claim 8 Chang discloses, The quantum cascade laser according to claim 7, wherein the composition ratio of N in said group III-V compound semiconductor is no less than 0.1% and no more than 40% (See Paragraph [0042]).

5. Claims 7 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Dapkus (US 6621842).

As for claim 7 Dapkus discloses, a quantum cascade laser comprising: a semiconductor substrate formed of GaAs (See Column 8 line 6); and an active layer (fig 2B), disposed on said semiconductor substrate and having a plurality of quantum well light emitting layers, generating light by means of intersubband transitions in a quantum well structure (fig 2B), and a plurality of injection layers, respectively disposed between the plurality of quantum well light emitting layers and forming a cascade structure along

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with said quantum well light emitting layers; and wherein said quantum well light emitting layers and said injection layers of said active layer are formed to contain group III-V compound semiconductors, each containing, as the group V elements, N and at least one element selected from the group consisting of As, P, and Sb (See Column 5 lines 4,5).

As for claim 8 Dapkus discloses, The quantum cascade laser according to claim 7, wherein the composition ratio of N in said group III-V compound semiconductor is no less than 0.1% and no more than 40% (See Column 5 lines 4,5).

6. Claim 7 rejected under 35 U.S.C. 102(b) as being anticipated by Spruytte et al. (2002/0075920). Spruytte discloses in figure 2, a quantum cascade laser comprising: a semiconductor substrate formed of GaAs (42); and an active layer (46), disposed on said semiconductor substrate and having a plurality of quantum well light emitting layers, generating light by means of intersubband transitions in a quantum well structure (left side), and a plurality of injection layers, respectively disposed between the plurality of quantum well light emitting layers and forming a cascade structure along with said quantum well light emitting layers; and wherein said quantum well light emitting layers and said injection layers of said active layer are formed to contain group III-V compound semiconductors, each containing, as the group V elements, N and at least one element selected from the group consisting of As, P, and Sb (GaIn**N**As).

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Taylor (US 6849866) discloses using a GaAs substrate and controlling the ratio of N doping. Hwang (US 6560259) discloses a QCL.

### ***Response to Arguments***

8. Applicant's arguments filed 2/12/04 have been fully considered but they are not persuasive.

9. The argument that Chang only discloses a single quantum layer is not found persuasive because, Chang states "FIG. 8 is a flow chart illustrating a ***simplified*** exemplary process for fabricating a semiconductor light-emitting structure having an active region as shown in FIG. 7."([0048]). Fig 7 shows multiple quantum wells. If the process of Fig. 8 discloses how to make the active layer shown in Fig 7 (as stated by Chang [0048]). The process would create several quantum wells as shown by Fig. 7.

10. The argument about the definition of "cascade structure" is not persuasive because paragraphs [0120] to [0122] just points to fig. 8 and do not give a definition. In absence of an explicit definition for a term the examiner has the responsibility to give a term its broadest reasonable interpretation. A reasonable definition of Cascade is "2 a : something arranged or occurring in a series or in a succession of stages so that each stage derives from or acts upon the product of the preceding" (<http://m-w.com/dictionary/cascade>). The quantum wells of Chang, Dapkus, and Spruytte all

11. The argument that the quantum cascade laser is a "unipolar laser device" is not persuasive because the limitation "unipolar device" is not recited in the rejected

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claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

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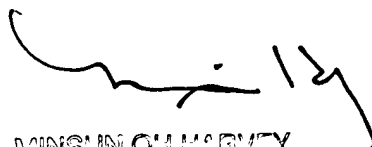
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey D. Lane whose telephone number is (571) 272-1676. The examiner can normally be reached on Monday thru Friday 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeffrey D Lane  
Examiner  
Art Unit 2828

JDL

  
MINSUN CH HARVEY  
Patent Examiner